August 18, 2011

Mr. Eric Schwaab
Assistant Administrator for Fisheries
U.S. Department of Commerce
NOAA Fisheries
National Marine Fisheries Service
1201 NE Lloyd Boulevard, Suite 1100
Portland, Oregon 97232

Dear Mr. Schwaab:

The Oregon Department of Fish and Wildlife (ODFW), Washington Department of Fish and Wildlife (WDFW), and Idaho Department of Fish and Game (IDFG), on behalf of their respective states (hereafter called "the States"), submit this application to the National Marine Fisheries Service (NMFS) under Section 120(b)(1)(A) of the Marine Mammal Protection Act of 1972 (MMPA; 16 U.S.C. §1361 et seq.) for the intentional lethal removal of California sea lions that are having a significant negative impact on the recovery of Columbia River and Snake River salmonids (salmon and steelhead; *Onchorynchus* spp.) listed as threatened and endangered under the Endangered Species Act of 1973 (ESA; 16 U.S.C. §1531 et seq.).

The U.S. population of California sea lions has experienced an incredible recovery over the past 35 years. As a result, California sea lion numbers in the lower Columbia River have increased, as has their predation on ESA-listed salmonids. Beginning just 10 years ago, California sea lion numbers and their predation on salmonids attempting to pass Bonneville Dam, 145 miles upriver from the ocean, has increased from negligible levels to substantial losses. Direct observation of sea lion predation on salmonids in the area within ¼ mile of the dam has documented a loss of more than 1,000 salmonids in 2002, increasing to a loss of more than 5,000 fish in 2010. It is important to note that these are minimum estimates of the number of salmonids lost to California sea lion predation in the lower Columbia River. Additional observations in other areas throughout the river and bioenergetic modeling demonstrate that these estimates are just a fraction of the total number of Columbia River and Snake River (Columbia Basin) salmonids taken by California sea lions each year.

Extensive actions are being taken to improve the survival of salmonids in the Columbia Basin (e.g. harvest management and reductions, hatchery program improvements, hydroelectric system

mitigation, watershed and sub-basin planning, habitat improvement). All of these efforts will continue to increase as comprehensive recovery plans are implemented. Despite these efforts, however, many ESA-listed Columbia Basin salmonids remain at high risk of extinction. Growing numbers of California sea lions in the river and their increasing predation on salmonids represent a mounting threat to the recovery of listed fish stocks. No other form of salmonid mortality would be permitted to rise from low levels just 10 years ago to such high levels today. All threats to salmonid recovery must be addressed, including California sea lion predation, for a comprehensive recovery strategy to be successful. Without direct management, it is likely that the California sea lion predation impacts to ESA listed salmon populations will increase and offset survival improvements from other recovery actions in the Columbia Basin.

You are aware of all the work that has been done by the States and our federal partners to address this growing predation problem in recent years (extensive but ineffective use of non-lethal hazing tools, failed attempts at sea lion translocation, important marking programs to identify individual predatory sea lions, critical observations to document predation rates, etc.). Under the previously issued MMPA Section 120 Letter of Authority for lethal removal of California sea lions the States made real progress at removing the most dominant sea lion predators that occurred in the area below Bonneville Dam. The loss of that authority in 2011 prevented the States from continuing to reduce the number of California sea lions consuming salmonids as they attempt to pass the dam. It is critical to reinstate this predator control program so that this form of salmonid mortality can he addressed along with all other sources of loss that are managed by the States and the federal government.

No action on reducing California sea lion predation in the lower Columhia River will likely result in an expansion of the problem by allowing increasing numbers of sea lions to become recruited into the existing pool of nuisance animals. The expected benefit from the permanent removal of the animals in question will be to reduce this relatively recent, unnatural (California sea lions were not historically found in this area of the Columbia River), and significant source of mortality to ESA-listed salmonids in the basin. The 1994 MMPA amendment creating Section 120 was intended to deal with situations such as this and we urge the Secretary to approve the States' request.

The States look forward to continuing our work with NMFS to address the sea lion predation issues in the Columbia River.

Sincerely,

Roy Elicker
Director
Oregon Department of
Fish and Wildlife

Philip Anderson
Director
Washington Department
of Fish and Wildlife

Virgil Moore
Director
Idaho Department
of Fish and Game

c: Garth Griffin, National Marine Fisheries Services

REQUEST FOR MARINE MAMMAL PROTECTION ACT SECTION 120 AUTHORIZATION TO REMOVE CALIFORNIA SEA LIONS FROM THE COLUMBIA RIVER

SUBMITTED BY OREGON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, AND IDAHO DEPARTMENT OF FISH AND GAME

AUGUST 18, 2011

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I. APPLICATION

The Oregon Department of Fish and Wildlife (ODFW), the Washington Department of Fish and Wildlife (WDFW), and the Idaho Department of Fish and Game, on behalf of their respective states (hereafter called "the States"), submit this application under Section 120(b)(1)(A) of the Marine Mammal Protection Act of 1972 (MMPA; 16 U.S.C. §1361 et seq.) to the National Marine Fisheries Service (NMFS) for the intentional lethal removal of California sea lions (*Zalophus californianus*) in the Columbia River which are having a significant negative impact on the recovery of Pacific salmon and steelhead (*Onchorynchus* spp.) listed as threatened and endangered under the Endangered Species Act of 1973 (ESA; 16 U.S.C. §1531 et seq.). Impacted salmon and steelhead are from multiple ESA-listed populations that include Lower Columbia River steelhead (threatened), Middle Columbia River steelhead (threatened), Upper Columbia River Spring Chinook (endangered), Snake River spring/summer Chinook (threatened), and Snake River steelhead (threatened).

The states propose to lethally remove individually identifiable predatory California sea lions that are having a significant negative impact on ESA-listed salmonids. We define such animals as having natural or applied features that allow them to be individually distinguished from other California sea lions and:

- have been observed eating salmonids at Bonneville Dam, in the "observation area" below the dam, in the fish ladders, or above the dam, between January 1 and May 31 of any year;
- have been observed at Bonneville Dam on a total of any 5 days (consecutive days, days within a single season, or days over multiple years) between January 1 and May 31 of any year; and
- are sighted at Bonneville Dam after they have been subjected to active non-lethal deterrence.

Capture, holding, and euthanasia of individually identifiable predatory California sea lions will be carried out under the guidance of our previously established Institutional Animal Care and Use Committee (IACUC). When possible the States will facilitate the transfer of predatory sea lions to pre-approved holding facilities for permanent captivity. The States will not lethally remove more than one percent of the potential biological removal (PBR) level annually and will continue to pursue non-lethal alternatives that reduce both sea lion predation on salmonids and the number of sea lions removed. The expected benefit of the requested removal authority will be to reduce this recent, unmanageable (without removal authority), and growing source of mortality that has jeopardized the States' ongoing efforts to recover ESA-listed salmonids in the Columbia River and Snake River Basins.

With this application, the States are requesting a new 5-year MMPA Section 120 predatory pinniped removal authority identical to the authority NMFS issued to the States on May 13, 2011. The States will review the program on an annual basis and evaluate its effectiveness at reducing sea lion predation on salmonids at Bonneville Dam. These evaluations will determine whether or not the States will continue the removal program in each subsequent year, and if an extension of the authority is needed at the end of the 5-year period.

II. BACKGROUND

On November 13, 2006, the States of Washington, Oregon, and Idaho applied to NMFS under Section 120 of the MMPA to permanently remove California sea lions in the Columbia River which were having a significant negative impact on the recovery of Pacific salmon and steelhead listed as threatened and endangered under the ESA[1]. On January 30, 2007, NMFS determined that the application contained sufficient information to warrant convening a Pinniped-Fishery Interaction Task Force to evaluate the request and recommend its approval or denial.[2] Based on information presented in the States' application as well as presented to the Task Force, a majority (17 out of 18 members) concluded that California sea lions were indeed having a significant negative impact on the recovery of Columbia Basin (including Snake River) salmonids and therefore recommended NMFS approve the States' Section 120 request.[3]

On March 18, 2008, after complying with the MMPA, the National Environmental Policy Act (NEPA), and the Endangered Species Act, NMFS partially approved the States' application and issued a Letter of Authority (LOA) for the lethal removal of certain California sea lions.[4] Removal activities, however, were temporarily suspended later that year following a lawsuit in the U.S. District Court in Oregon by the Humane Society of the United States (HSUS). Removals resumed in 2009 while the case was being heard in U.S. District Court and the 9th Circuit Court of Appeals. Removal activities were ultimately suspended again on November 23, 2010, when the appeals court partially ruled in favor of HSUS.[5]

During the first three years of authorization (2008-2010) a total of 37 qualifying California sea lions were permanently removed from the Columbia River: 10 were placed in permanent captivity, 1 died during a health exam, and 26 were chemically euthanized. An additional three California sea lions that had not yet qualified for removal died accidentally during trapping operations in 2008, bringing the total to 40 California sea lions over the three year period.

As stipulated in the initial LOA issued to the States on March 17, 2008, a review of the removal program was conducted by NMFS after the completion of the third year of activities. The review included a meeting by the reconvened Pinniped-Fishery Interaction Task Force during October and November 2010.[6] The Task Force reached consensus on several issues, concluding that the current non-lethal hazing program was ineffective at reducing predation, and that trapping needed to increase if the removal program was to succeed. In addition, a majority of the Task Force supported liberalizing the criteria used to determine an animal's eligibility for removal and rejected a proposal to discontinue the lethal removal program.

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[1] http://www.nwr.noaa.gov/Marine-Mammals/Seals-and-Sea-Lions/States-MMPA-Request.cfm (accessed 8/15/2011)
[2] http://www.nwr.noaa.gov/Marine-Mammals/Seals-and-Sea-Lions/Sec-120-TF-Rpt.cfm (accessed 8/15/2011)
[3] http://www.nwr.noaa.gov/Marine-Mammals/Seals-and-Sea-Lions/upload/Sec-120-TF-Rpt-2007.pdf (accessed 8/15/2011)
[4] http://www.nwr.noaa.gov/Marine-Mammals/Seals-and-Sea-Lions/Sec-120-Authority.cfm (accessed 8/15/2011)
[5] http://www.ca9.uscourts.gov/datastore/opinions/2010/11/23/08-36038.pdf (accessed 8/15/2011)
[6] http://www.nwr.noaa.gov/Marine-Mammals/Seals-and-Sea-Lions/Sec-120-TF-Rpt.cfm (accessed 8/15/2011)

Following the Task Force meeting and the ruling by the 9th Circuit Court of Appeals, NMFS announced that they would issue a new LOA to the States by spring 2011.[7] On May 13, 2011, NMFS issued the new LOA, which was used to remove a single California sea lion before the states voluntarily suspended removal activities in response to another lawsuit by HSUS. After reviewing the lawsuit, NMFS revoked the States' new LOA effective July 27, 2011[8], and indicated that if the States' wished to continue the predator removal program, a new application under Section 120 would need to be submitted to NMFS for review.

As stated in the original 2006 application, the States' contend that salmonid predation by California sea lions at Bonneville Dam represents a significant negative impact on the recovery of ESA-listed populations of Columbia Basin salmonids. Predation by California sea lions below Bonneville Dam is a recent, growing, and unmanageable (without removal authority) source of mortality, whereas other sources of in-river mortality are actively managed, and are stable or decreasing (e.g., through harvest reductions, fish passage and habitat improvements, and hatchery reform). Furthermore, the hydromodification of the river has altered the natural predator-prey relationship to artificially favor predatory California sea lions. It is not the States' contention that California sea lion predation is more significant than other sources of mortality to Columbia Basin salmonids, but simply that it is a new and significant source of mortality that must be dealt with as are other sources of mortality to Columbia Basin salmonids that have prompted corrective action under the ESA.

Additional background and justification for this application can be found in the States' original 2006 application, Pinniped-Fishery Interaction Task Force documents and reports, NMFS's NEPA, MMPA, and ESA analyses, and material presented to federal district and appeals courts.[9]

III. APPLICATION CONSIDERATIONS—SECTION 120(d)

A. Pinniped population trends, feeding habits, and interaction description—SECTION 120(d)(1)

1. Status and trends of California sea lions

The MMPA was passed in recognition that many marine mammal populations were depleted and that they should be protected until they again became a significant functioning element of the ecosystem. In the case of pinnipeds in the Pacific Northwest, protection provided under the MMPA has been a huge success. Populations of Steller sea lions (*Eumetopias jubatus*), Pacific harbor seals (*Phoca vitulina*), and California sea lions have all increased since the MMPA was passed (Jeffries et al. 2003, Brown et al. 2005, Pitcher et al. 2007, Carretta et al. 2011).

Currently, the U.S. stock of California sea lions is not listed as "threatened" or "endangered" under the ESA, nor as "depleted" or "strategic" under the MMPA (Carretta et al. 2011). The

[7] http://www.nwr.noaa.gov/Newsroom/Sea-Lion-Dcsn.cfm (accessed 8/15/2011)
[8] http://www.nwr.noaa.gov/Marine-Mammals/Seals-and-Sea-Lions/upload/Sec-120-LOA-withdraw.pdf (accessed 8/15/2011)
[9] http://www.nwr.noaa.gov/Marine-Mammals/Seals-and-Sea-Lions/States-MMPA-Request.cfm (accessed 8/15/2011)

population has been growing at 5.6% per year and is estimated to number a minimum of 238,000 animals (Carretta et al. 2011). The PBR level, which is the level of human caused mortality permitted under the MMPA and subsequent regulations, is 8,511 animals per year (Carretta et al. 2011).

2. California Sea Lions in the Columbia River

California sea lions occur seasonally in the Pacific Northwest, migrating northward each fall from their breeding grounds in southern California and Mexico in search of foraging areas, returning to their southern breeding areas again the following summer (Peterson and Bartholomew 1967, Odell 1981). With the exception of a few females, all California sea lions in the Pacific Northwest are subadult or adult males. It is from fall through spring when California sea lions are present in the lower Columbia River, with most animals being found in upriver areas from January through May (Wright et al. 2010, Stansell et al. 2010).

While archaeological data indicate that California sea lions were present at times along the Oregon coast during at least the last 3,000 years (Lyman 1988), there is no similar archaeological evidence of their presence in the lower Columbia River. In contrast to California sea lions, there is evidence of harbor seals in the lower Columbia River that date back 10,000 years (Lyman et al. 2002). Until recently, Steller sea lions were the dominant sea lion species in the Pacific Northwest and harbor seals were the most commonly observed pinniped in the lower Columbia River (Pearson and Verts 1970). Prior to enactment of the MMPA in 1972, Oregon and Washington had bounties in place in an effort to keep pinniped populations low, and a seal hunter was employed to drive pinnipeds out of the Columbia River until 1970 (Pearson and Verts 1970). By the mid-1970s, observations of California sea lions in the Pacific Northwest began to increase but they were still relatively uncommon in the lower Columbia River until the mid- to late-1980s (Beach et al. 1985).

By the early 1990s, several hundred California sea lions were regularly found in the Astoria area, hauling out on jetties, floats, and navigation markers (WDFW, ODFW, unpublished data). At that time, sea lions were foraging in the lower river to near Wallace Island (river mile 48), often targeting salmon caught in nets during commercial gillnet fishing seasons. However, these sea lions also began to forage farther upriver in search of prey, including anadromous smelt or eulachon (*Thaleichthys pacificus*) that returned to tributaries such as the Cowlitz River (river mile 70). In the mid-1990s observations of California sea lions in the Willamette River and Willamette Falls (128 miles upstream from the mouth of the Columbia) began to increase. By the late 1990's roughly a dozen sea lions were regularly found foraging for winter steelhead and spring Chinook (both ESA-listed species) below the fishways at Willamette Falls. More recently, California sea lions have been observed feeding on salmonids in the Lewis, Kalama, and Cowlitz Rivers.

At Bonneville Dam, one to two California sea lions were reported during fishway inspections almost every year since the 1980's (Stansell 2004). However, in 2001, there were reports of up to six sea lions observed at one time. By 2002 the U.S. Army Corps of Engineers (ACOE) estimated that 30 sea lions were foraging at the dam for salmonids from January through May. Since then the minimum number of California sea lions has ranged from 54 to 104 animals, with

animals generally arriving earlier and occurring over a longer period each year (Table 1). While the annual number of individuals has been relatively stable, the cumulative number of recruits into the Bonneville "population" continues to increase each year.

Table 1. Annual pinniped abundance and duration at Bonneville Dam from 2002-2010.

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Min. total number of individual pinnipeds	31	109	104	86	86	82	123	82	166
California sea lion	30	104	99	81	72	71	82	54	89
Steller sea lion	0	3	3	4	11	9	39	26	75
Harbor seal	1	2	2	1	3	2	2	2	2
Max daily number of pinnipeds	14	32	37	43	46	54	63	47	69
Max number of days individual California sea lion was present	16	25	33	39	73	70	80	67	39
Average number of days California sea lion was present	5.3	6.5	7.6	7.5	19.9	20.3	19	19	9.3
Date of first California sea lion sighting	3/20	3/14	2/22	2/20	2/9	1/8[a]	1/9[b]	1/5	1/8
Date of last California Sea lion sighting	5/17	5/27	5/26	6/10	6/5	5/26	6/2	5/29[c]	6/1
Total days California sea lion were present	59	71	95	96	106	123	146	145	145

Source: ACOE cited in NMFS[10]

[a] In 2007, a CSL was seen at the dam on 11/8/07, prior to the 2008 spring season.

[b] In 2008, sea lions were observed as early as 9/18/08, prior to the 2009 season.

[c] In 2009, one CSL passed the dam and remained upriver and in the forebay all summer, fall and winter.

The annual ACOE report documenting California sea lion numbers, predation rates, salmonid abundance, and salmonid losses at Bonneville Dam for 2011 was not yet available at the time of this submission. In general, however, 2011 was an unusual year for a number of reasons. Water levels and river flow were extremely high due to above average winter and spring snow falls. The resulting high turbidity and extended low water temperatures delayed the arrival of spring salmonids at Bonneville Dam. Similarly, daily average California sea lion numbers at Bonneville Dam were lower than in recent years, particularly early in the season when salmonid abundance at the dam was low. Partially as a result of these factors, the 2011 estimate of salmonids lost to California sea lions at Bonneville Dam will likely be lower than in recent years. However, this does not mean that there is no longer the need to continue reducing the numbers of California sea lions that forage at Bonneville Dam. In all likelihood, known individual predatory sea lions continued to forage in other areas where salmonids were congregating prior to approaching the dam late in the season. While salmonid run sizes, weather conditions, and predatory sea lion activity will vary from year to year, California sea lion management must continue in order to contribute to salmonid recovery over the long term.

[10] http://www.nwr.noaa.gov/Marine-Mammals/Seals-and-Sea-Lions/upload/Sec-120-DM-2011.pdf (accessed 8/15/2011)

3. California sea lion feeding habits

California sea lions are opportunistic predators that feed on a wide variety of fish and squid. In California, their diet consists primarily of Pacific whiting, anchovy, market squid and shortbelly rockfish (Scheffer and Neff 1948, Fiscus and Baines 1966, Fiscus 1979, Antonelis et al. 1984). In coastal waters of Washington and Oregon, their diet consists primarily of seasonally abundant schooling species such Pacific whiting, herring, Pacific mackerel, eulachon, salmon and squid as well as Pacific lamprey, codfish, walleye pollock, and spiny dogfish (Beach et al. 1985, Scordino 2010, ODFW unpublished data). Movements and distribution of California sea lions are often correlated with spawning aggregations of various prey (e.g., Pacific whiting, herring, salmonids) and indicate the ability of California sea lions to cue into locally abundant concentrations of these species (NMFS 1997). While California sea lions at Bonneville Dam have been documented eating lamprey, shad, northern pikeminnow, and sturgeon, their primary prey at the dam are salmonids (Tables 2-3; also see Stansell 2010).

Table 2. Percent frequency of occurrence of prey items identified in California sea lion scat (*n*=68) collected at Bonneville Dam, 2006-2010.

Prey type	% frequency of occurrence
Adult salmonid	92.7
Juvenile salmonid	10.3
Lamprey	8.82
Pacific lamprey	4.41
American shad	4.41
Sturgeon	2.94
Unidentified fish	2.94
Sucker	1.47
Salmonid (unknown age class)	1.47
Cyprinid	1.47
Codfishes	1.47
Sculpin	<1
Perch	<1
Threespine stickleback	<1
Flatfish/not Dab	<1
Squid	<1

Source: ODFW

Table 3. Prey items identified in California sea lion gastrointestinal tracts (*n*=16) collected at Bonneville Dam, 2008-2010.

California sea lion	Prey
2008-1	2 adult salmonids
2008-2	3 adult salmonids
2008-3	3 adult salmonids ; 1 lamprey
2008-4	empty
2010-1	1 adult salmonid; cyprinid (carp & minnow family); perch
2010-2	1 salmonid; sculpin
2010-3	2 adult salmonids
2010-4	2 adult salmonids
2010-5	2 adult salmonids
2010-6	2 adult salmonids; cyprinid (carp and minnow family)
2010-7	3 adult salmonids
2010-8	4 adult salmonids
2010-9	5 adult salmonids
2010-10	5 adult salmonids
2010-11	6 adult salmonids
2010-12	empty

Source: ODFW

4. Identification of individual predatory sea lions

As numbers of California sea lions foraging for salmonids in the Columbia River and its tributaries began to increase in the 1990s, ODFW (with support from NMFS and WDFW) began a capture and marking operation in 1997 located in Astoria, Oregon. The goal of this project was to apply permanent, individually identifiable marks to California sea lions using the Columbia River in order to: (1) observe the movements and activities of individual sea lions in the river; (2) describe foraging patterns of individual animals; and (3) to document the recurrence of individual sea lions at specific foraging areas from year to year. The program was expanded to Bonneville Dam in 2007. Other California sea lion branding programs occur in Puget Sound, Washington, and the Channel Islands, California. In addition to branded animals, individual predatory sea lions are also identified based on photographic documentation of natural marks such as pelage coloration, scars, wounds, and other physical characteristics.

Based on brands and natural marks, ACOE observation staff can identify most California sea lions at the dam and tally their salmonid catch and residence time (hence meeting removal criteria outlined in this application). As of fall 2010, a total of 264 California sea lions had been uniquely identified at the dam. Of these, 116 were branded (86 branded in Astoria, 25 at Bonneville Dam, 4 in the Channel Islands, and 1 in Puget Sound) and 148 had highly identifiable natural marks.[11]

[11] http://www.mediate.com/DSConsulting/docs/coe-2008-2010bonnpinniped%20presentation.pdf (accessed 8/15/2011)

B. Nonlethal deterrence efforts—SECTION 120(d)(2)

1. Existing nonlethal deterrent methods

Non-lethal methods to deter pinnipeds from feeding on fish or using specific areas are described in NMFS (1997), Fraker and Mate (1999), Bowen (2004), and Scordino (2010). While in some cases it's been found that deterrents can be effective on new or "naïve" animals, the same methods become ineffective over time or when used in the presence of experienced animals that did not react to deterrents (NMFS 1996). To date, efforts at finding an effective, long-term solution to eliminating or reducing predation on salmonids have proven unsuccessful. For example, Smith-Root recently spent over five years developing a novel sonar-integrated, non-lethal electrical array to inhibit upriver movement of pinnipeds in search of prey (Burger 2010). While promising, this effort was abandoned after it was found to also impede spring Chinook movements which was unacceptable to fishery managers.

2. Nonlethal deterrent efforts at Bonneville Dam

WDFW, ODFW, ACOE, and the Columbia River Inter-Tribal Fish Commission (CRITFC) have invested considerable time and resources trying to non-lethally deter sea lions from the Bonneville Dam tailraces (e.g., Brown et al. 2007, 2008, 2009, 2010; Stansell 2004, Stansell et al. 2010; Tackley et al. 2008; Wright et al. 2007). Deterrent methods were first tested at the dam in 2005 and 2006, and have continued each spring through 2011. Methods have included aerial and underwater pyrotechnics, acoustic harassment devices, vessel chase, rubber projectiles, and capture-relocation. For example, in 2010 alone, boat-based hazing crews used approximately 5000 rounds of cracker shells, 750 seal bombs, and 100 rounds of rubber buckshot in attempts to deter sea lions from the Bonneville Dam tailraces (Brown et al. 2010). While thought to be potentially effective at deterring new animals arriving at the dam for the first time, they have been ineffective at deterring habituated animals. As noted above, one conclusion of the Pinniped-Fishery Interaction Task Force at their fall 2010 meeting was that the non-lethal hazing program was ineffective and should be removed as a condition of the States' removal authority.[12]

C. Impact on fish populations—SECTION 120(d)(3)

1. Status of salmon and steelhead in the Columbia Basin

Currently there are eight Evolutionary Significant Units (ESUs) of salmon and five Distinct Population Segments (DPS) of steelhead in the Columbia Basin listed under the ESA (Table 4)[13]. Of these, eight are potentially subject to predation by California sea lions (and other pinnipeds) in the mainstem Columbia River and its tributaries, and five are potentially subject to predation as they attempt to pass above Bonneville Dam.

[12] http://www.nwr.noaa.gov/Marine-Mammals/Seals-and-Sea-Lions/Sec-120-TF-Rpt.cfm (accessed 8/15/2011)
[13] http://www.nwr.noaa.gov/ESA-Salmon-Listings (accessed 8/15/2011)

Table 4. Status and potential exposure of ESA-listed Columbia Basin salmonids to California sea lion predation.

		Potentially impacted by California sea lions (Jan 1 – June 30)	
ESA-listed Columbia Basin salmonids	Status	Mainstem & tributaries	Bonneville Dam
Upper Columbia R. Spring Chinook	Endangered	X	X
Snake R. Spring/Summer Chinook	Threatened	X	X
Lower Columbia R. Steelhead	Threatened	X	X
Mid-Columbia R. Steelhead	Threatened	X	X
Snake R. Steelhead	Threatened	X	X
Lower Columbia R. Chinook	Threatened	X	
Upper Willamette R. Chinook	Threatened	X	
Upper Willamette R. Steelhead	Threatened	X	
Upper Columbia R. Steelhead	Threatened		
Snake R. Fall Chinook	Threatened		
Columbia R. Chum	Threatened		
Lower Columbia R. Coho	Threatened		
Snake R. Sockeye	Endangered		

The salmon and steelhead returning to areas of the Columbia Basin upstream of Bonneville Dam are potentially subject to migration delays and increased marine mammal predation at Bonneville Dam. Within each ESU/DPS there are multiple populations at various levels of risk of extirpation (see Appendix). Status of individual populations within ESUs/DPSs subjected to sea lion predation during winter and spring in the Columbia River is variable, with some populations already extirpated and the remaining populations at variable risks of extirpation. In addition, the salmon and steelhead originating below Bonneville Dam are potentially subject to marine mammal predation in the mainstem migration corridor, as well as from sea lions entering the various tributaries in the lower Columbia River (e.g., Cowlitz, Kalama, Lewis, and Willamette Rivers).

2. Predation impact at Bonneville Dam

In 2002 the ACOE Fisheries Field Unit began a research effort to determine when pinniped predation occurs in the Bonneville Dam tailrace, numbers of pinnipeds present, numbers of individuals observed, numbers of salmonids consumed, and the proportion of all salmonids passing Bonneville that are taken by pinnipeds foraging in the tailrace of the dam (Stansell 2004, Tackley et al. 2008, Stansell et al. 2010). Total and per capita predation by California sea lions has generally increased over the period of study whereas the proportion of the run taken has fluctuated with run size (Table 5).

Table 5. Consumption of salmonids by California sea lions at Bonneville Dam from January 1 through May 31, 2002 to 2010.

Year	Expanded salmonid consumption by California sea lions	Run size (Jan 1-May 31)	% of run	Per capita salmonid consumption by California sea lions	Salmonids consumed by a single individual
2002	1,010	284,732	0.4%	33.7	51
2003	2,329	217,934	1.1%	22.4	52
2004	3,516	186,771	1.8%	35.1	35
2005	2,904	81,252	3.5%	35.9	NA
2006	2,944	105,063	2.7%	40.9	79
2007	3,846	88,474	4.2%	54.2	64
2008	4,294	147,558	2.8%	52.4	107
2009	4,014	186,058	2.1%	74.3	157
2010	5,095	267,166	1.9%	57.2	198

Source: Stansell et al. 2010; Stansell pers. com. 2011

It is important to note that estimates of loss at Bonneville Dam are minimum estimates because they apply only to daylight predation within ¼ mile of the Bonneville Dam tailrace and forebay structures. Many more predation events occur near the dam and further downriver that the observers cannot see and thus do not record. California sea lions have been documented feeding on salmonids from Bonneville Dam to the river mouth (WDFW, ODFW, unpublished data). In addition, there is an unknown amount of delayed mortality caused by injury to fish that escape predation. Pinniped predation estimates at the dam therefore represent a minimum lower bound on total river-wide predation.

It is also important to note that California sea lions consume natural origin as well as hatchery fish and their consumption is inversely proportional to run size (i.e., the proportion of the run consumed goes up as the run size goes down). Sea lion predation at Bonneville Dam is also believed to be disproportionately high for the early returning components of spring run Chinook which are likely to be from discrete populations (e.g., Appendix). In contrast to sea lion predation, non-tribal human harvest is primarily mark-selective (i.e., hatchery fish only), and all harvest is abundance-based (i.e., harvest goes down as run size goes down). Since salmonid population dynamics are cyclical, it is only a matter of time before recently large run sizes give way to small run sizes which will lead to an even greater predation impact than has been seen recently.

Thus, referring only to the percentage of the run taken by sea lion predators each year is an inappropriate and misleading metric. While it may appear that the negative impact of sea lion predation is declining, this only reflects the increase in run sizes that have occurred over recent years (through 2010). Table 5 clearly indicates that the number of salmonids taken by sea lions has increased significantly from 2002 through 2010, regardless of run size.

3. Addressing predation as part of a comprehensive fish recovery strategy

Significant actions to address the decline of salmonid populations in the Columbia Basin have been underway for decades and are progressing each year as a result of development and

implementation of ESA conservation and recovery plans throughout the basin. These actions include habitat improvement, hydroelectric system mitigation, harvest reductions, hatchery reform, and predator management.

a. Habitat

Local area watershed recovery boards have been established and funded for every region (or domain) in which ESA-listed salmon and steelhead populations originate. These recovery boards have been charged with developing action plans aimed at recovery of local salmon populations. These board members include representatives of local county and city governments, tribes, state and federal agencies, and local citizens. The recovery boards take inventory of the primary limiting factors and develop a corresponding suite of actions needed to remedy those factors. The action plans cover changes in land use, water access, and restoration of local habitat, local utility dam operations, as well as changes in salmon hatchery practices and restricted or closed fisheries. There is also an established Columbia River Estuary Partnership that consists of state, federal and tribal representatives and includes active involvement of local habitat restoration-focused environmental organizations. Estuary recovery actions address habitat restoration, water flow, and predation in the lower 145 miles of the Columbia River in which all listed populations pass through on the way to and from the ocean. The recovery plans include reduction of excessive bird, fish, and marine mammal predation as a key component of a comprehensive recovery strategy.

b. Hydropower

The Federal Columbia River Power System (FCRPS) is operated to benefit the citizens of the Northwest through flood control and generated clean energy. Operation of the system also includes a legal obligation to operate in a manner that mitigates the effects of the Columbia River federal hydro-system so as to not jeopardize the continued existence of endangered and threatened salmon and steelhead populations. The most recent plan for salmon protection and recovery in 2008 commits the federal power system operators to invest hundreds of millions of dollars to support both operational changes to improve fish passage through the hydro-system as well as funding support for other important actions involving habitat restoration, hatchery reform, fishery management, and reducing predation by fish, birds, and marine mammals. This mitigation commitment provides much of the funding for the actions developed in the local ESA recovery plans.

c. Harvest

Fisheries that effect Columbia River salmon populations have been progressively reduced over the past several decades in response to the declining salmon populations. The states and tribes have implemented actions through management agreements to ensure fisheries are operated in a manner that protects the weaker salmon populations while ensuring federal court orders that require salmon harvest to be shared equitably between treaty Indian and non-Indian citizens are upheld. Formal actions include International Agreements through the Pacific Salmon Treaty with Canada as well as *U.S. v. Oregon* court ordered agreements for Columbia River fisheries that include ESA provisions to ensure that Columbia River harvest does not jeopardize wild salmon

populations. These harvest actions have greatly reduced fisheries from past levels with significant economic consequences to Northwest communities that rely on fisheries as well as economic and cultural effects on the Columbia River tribes. State managers, with federal assistance, are further developing selective fishery practices to enable better fishery access to hatchery-produced fish while avoiding or minimizing impacts to wild fish.

d. Hatcheries

The federal, state, and tribal managers in the Columbia Basin have been and continue to develop and implement operational plans for Columbia River salmon hatcheries to ensure that they are operated in a way that supports wild salmon recovery while continuing to provide hatchery fish to support Pacific Ocean and Columbia River fisheries and the economies that depend on these fisheries. A federally supported process included a recent basin-wide inventory by a panel of scientists called the Hatchery Scientific Review Group (HSRG). The HSRG has provided a set of recommendations for operation of each Columbia Basin hatchery consistent with wild fish recovery. The agencies and tribes are cooperatively addressing hatchery management measures in the basin and the federal power system agencies have committed to investing in hatchery reform and monitoring as part of their support of basin-wide salmon recovery efforts.

e. Predation

The effects of certain natural predators of salmonids in the basin have increased dramatically from historical levels. This is partly due to changing habitat more appealing to certain fish and birds and partly due to increased numbers of predators due to various protection measures, including the Marine Mammal Protection Act (MMPA). Although the predation of salmon by birds, fish, and marine mammals may be natural, there are specific circumstances in the Columbia River where the predation has grown to a level where it is significantly out of balance with historic levels and cannot be ignored in a comprehensive recovery strategy. Because of this reality, the hydropower operators fund large programs to reduce northern pike minnow fish predation on juvenile salmon by reducing their numbers through a bounty reward program and to relocate record numbers of Caspian terns to alternative bird colony locations to reduce the impact on migrating salmon juveniles. The state and federal agencies are now coordinating an action plan to address Cormorant predation of salmon in the lower Columbia River and there is a commitment to study and develop plans concerning predation of salmon by non-indigenous fish populations.

The habitat, hydro, harvest, hatchery, and predation recovery actions represent a major monetary and social investment in the region, underscoring the importance of maintaining salmon populations to the citizens and governments of the four states and tribes that reside in the Columbia Basin. The people of the Northwest have supported restoration efforts, and are willing to bear the costs, because of the importance of salmon to our heritage, the cultural value to Native Americans, and the economic value of salmon to our communities. State and federal agencies, tribal and local governments, and the public, have developed these salmon recovery plans through an extraordinary collaborative effort and are committed to rebuild these depleted salmon populations.

D. Threats to public safety—SECTION 120(d)(4)

Commercial salmon gillnet fisheries in the Columbia River have encountered problems with harbor seals damaging gear and catch for many years. Similar problems with California sea lions have increased with growing numbers of these animals in the river through the 1990s. Most recently, negative interactions between sport anglers and California sea lions in many areas of the Columbia River and some tributaries has become a serious problem. California sea lions often exhibit bold and aggressive behaviors that include stealing hooked fish while they are being landed, even to the point of taking the fish from a landing net or the hands of an angler bringing the fish into the boat. There have been reports of anglers being bitten by sea lions in this situation as well as anglers being pulled overboard while holding onto a landing net that was grabbed by a sea lion[14]. Many sport angling vessels are small and could be capsized by these types of actions by sea lions taking hooked or netted fish from anglers close to the boat.

[14] http://www.oregonlive.com/portland/index.ssf/2011/05/sea_lion_yanks_a_willamette_ri.html (accessed 8/15/2011)

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APPENDIX. Salmon and steelhead populations that are impacted by California sea lion predation in the Columbia River during the winter and spring period. All populations are currently at abundance levels below the minimum threshold for long term survival and are listed under the ESA.

UPPER COLUMBIA SPRING CHINOOK ESU	SNAKE RIVER SPRING/SUMMER CHINOOK ESU	LOWER COLUMBIA CHINOOK ESU	LOWER COLUMBIA STEELHEAD DPS
Wenatchee River	*Lower Snake River*	*Cascade Spring*	*Cascade Winter*
Entiat River	Tucannon River	Upper Cowlitz	Lower Cowlitz
Methow River	Asotin	Cispus	Coweeman
Okanogan River	*Grande Ronde/Imnaha River*	Tilton	S.F. Toutle
	Upper Grande Ronde	Toutle	N.F. Toutle
	Lostine/Wallowa River	Kalama	Upper Cowlitz
	Catherine Creek	Lewis NF	Cispus
	Minam River	Sandy (OR)	Tilton
	Wenaha River	*Gorge Spring*	Kalama
	Lookinglass Creek	White Salmon	N.F. Lewis
	Imnaha River	Hood (OR)	E.F. Lewis
	Big Sheep		Salmon
	South Fork Salmon River		Washougal
	South Fork Mainstem		Clackamas (OR)
	Secesh		Sandy (OR)
	EF/Johnson Creek		*Gorge Winter*
	Little Salmon River		L. Gorge (HHD)
	Middle Fork Salmon River		U. Gorge (Wind)
	Big Creek		Hood (OR)
	Bear Valley		

UPPER COLUMBIA SPRING CHINOOK ESU	SNAKE RIVER SPRING/SUMMER CHINOOK ESU	LOWER COLUMBIA CHINOOK ESU	LOWER COLUMBIA STEELHEAD DPS
	Upper Mainstem MF		
	Chamberlain		
	Camas Creek		
	Loon Creek		
	Marsh Creek		
	Lower Mainstem MF		
	Sulphur Creek		
	Upper Salmon River		
	Lemhi		
	Lower Mainstem		
	Pahsimeroi River		
	East Fork Salmon River		
	Upper Salmon Main		
	Panther Creek (ext)		
	Valley Creek		
	Yankee Fork		
	NF Salmon River		